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CYCLOSORUS SUBPUBESCENS (Blume) Ching

A TAXONOMIC PROBLEM

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ABSTRACT

Several points of nomenclature involving *Cyclosorus subpubescens* (Blume) Ching have been discussed. Herbarium sheets 910327-113 and 908337-179 in the Rijksherbarium, Leiden have been determined as the holotype and isotype of this species respectively. The identification of the specimens in the "type cover" of the species at Kew Herbarium, as *Dryopteris subpubescens* (Blume) C. Chr. by Christensen and the description of *Cyclosorus subpubescens* (Blume) Ching by Ching have been established as erroneous, both characterising *Dryopteris pseudoamboinensis* Rosenstock (Rosenstock 1917). Holttum (1954) has, however, selected the Sumatran specimen cited under *Nephrodium molle* var. *major* (Beddome, 1892) as lectotype for *Dryopteris sumatrana* v.A.v.R., which name antedates *D. pseudoamboinensis* Rosenstock and therefore refers to *Cyclosorus sumatranus* (v.A.v.R.) Ching.

A list of herbarium specimens available at Kew Herbarium, London and Rijksherbarium, Leiden and identified to *C. subpubescens* (Blume) Ching, non sensu Ching is appended and the geographical distribution of this amphidiploid species has been indicated.

Cyclosorus Link is a genus of tropical ferns, first proposed by Link (1833), but finally adopted, after many vicissitudes of rank, as a generic name by Farwell in 1931. It belongs to the relatively primitive family, Thelypteridaceae (Holttum 1949, 1954) and comprises of 300 species. Copeland (1947), however, includes it in his Aspidiaceae. The species of *Cyclosorus* were for a long time included in *Polypodium, Nephrodium, Aspidium* and *Dryopteris. Cyclosorus* consists of many complex groups of related species which can be distinguished from each other by characters which, as Dr. Christensen puts it, "cannot be explained by words, but are easily observed by trained eyes, and so, the genus *Cyclosorus* is most difficult to deal with", (Ching, 1938). *C. parasiticus* complex is one of such groups.

The author, while working on the cytotaxonomy involving this species complex (Panigrahi and Manton, 1958) carried out a taxonomic survey of the herbarium specimens at Kew Herbarium, British Museum of the Natural History, London and Rijksherbarium, Leiden together with a thorough study of literature on the subject to find out correct names for the species under investigation.

It soon appeared from two of the most recent treatises on *Cyclosorus* (Ching, 1938; Holttum, 1954) that opinions are drastically contradictory and confusing, both regarding the identity and the scope of limits of the species, *Cyclosorus subpubescens* (Blume) Ching, which is evident from the list given below:

Ching (1938), after Christensen (1929)
Cyclosorus subpubescens (Blume) Ching

Basinym: *Aspidium subpubescens* Blume
Synonyms: *A. molle* β Benth.
A. abortivum Christ.
A. jaculosum Christ.
Dryopteris subpubescens C. Chr.
D. amboinense v.A.v.R.
D. parasitica var. *amboinense* C. Chr.
D. latipinna Kuntze
D. parasitica var. *latipinna* C. Chr.
D. jaculosa Christ.
D. papilio Christ.
D. pseudoamboinensis Rosenst.
D. sophoroides f. *ensiformis* Hayata
D. parasitica Merr.
Nephrodium amboinense Presl
N. molle var. *amboinense* Bedd.
N. extensum var. *minor* Bedd.
N. latipinna Hook.
Christella latipinna Leveilli

Holttum (1954)
Cyclosorus subpubescens (Blume) Ching

Basinym: *Aspidium subpubescens* Blume
Synonyms: *A. jaculosum* Christ.
Dryopteris subpubescens var. *major quoad* C. Chr.

Thus it may be seen that Holttum (*l.c.* p. 273-274) cites only two synonyms and remarks, "After careful examination of many specimens (including Blume's at Leiden), I think Christensen was mistaken, and am of opinion that the Singapore fern in question is the true *subpubescens*".

The situation, therefore, seemed formidable and one had to shelve, at least temporarily, all that has been written about this *C. parasiticus* complex over 200 years by numerous competent authorities, and tried to apply the rules of nomenclature, which state "each genus should have a type species and each species a type specimen", (Lawrence, 1951, p. 203).

C. subpubescens (Blume) Ching

Hence, the specimen for *C. subpubescens* (Blume) Ching in the "Type Cover" (Type cover at Kew—It is now understood that when Christensen examined this specimen of *Aspidium subpubescens* Blume there were no type covers in Kew Herbarium ; the specimen was put into such a cover later just before the war because it appeared likely to be a duplicate of a type and Christensen's label on it was part of the evidence.) for *D. subpubescens* (Blume) C. Chr. at Kew, was examined (Plate I). It was labelled as:—

Aspidium subpubescens Blume
Nephrodium canescens Wall.
Gymnogramme appendiculata Blume
Dryopteris subpubescens C. Chr. (det. C. Chr. 1930).

Yet, these specimens are very different from the Malayan materials of *C. subpubescens* (sensu Holttum) and are exactly identical with *D. pseudoamboinensis* Rosenstock as also with *C. sumatranus* (v.A.v.R.) Ching.

The perplexities in the problem are self-evident and need not be discussed. Either this specimen is the holotype or isotype of *Aspidium subpubescens* Blume and hence, Christensen was right and Holttum was wrong, or *vice versa.*

Here again, one had to fall back on the literature. Goddijn (1931) stated, "In recent times frequently interchange of labels and sheets have been found in type specimens, e.g. of Blume. This confusion must date back to the period before 1870". Again, Van Steenis (1950) states "the records of duplicates in foreign herbaria are certainly in several cases untrustworthy, as Blume sent duplicates from various collectors . . . As to his own collections . . . at Government expense (viz., Blume and Zippel plants) were selected and kept at the Leiden Herbarium".

Hence, the isotype specimen for *Aspidium subpubescens* Blume at Leiden was examined. It is labelled as follows:

Aspidium subpubescens Blume . . . Herb. Lugd. Bat. No. 908337-179, Dr. Blume, Java 1828.

Dryopteris subpubescens (Blume) C. Chr. (det. Rosenstock, 1917).

This specimen has been labelled by Blume himself, and was collected by him from Java in 1828. (The handwriting has been compared with Blume's specimen handwriting in the presence of Dr. S. Van Overstorem of Leiden Herbarium). This specimen is exactly identical with Holttum's *Cyclosorus subpubescens* materials from Singapore. This proved the accuracy of Holttum's opinion, but threw no light on the so-called type-sheet at Kew. On further search (at Leiden), only one more sheet was found labelled as:

908337 . . . 184	*Aspidium subpubescens* Blume *A. amboinense* Blume
Java, 1828	*Nephrodium amboinense* Presl det. Rosenstock 1917 . . . *Dryopteris subpubescens* (Blume) C. Chr.

It is interesting to note that the three above names (excluding Rosenstock's determination), on the label had been written by the same man ; the handwriting on the Kew sheet appears to be his handwriting as well. None of these, however, are certainly Blume's (who also described *Aspidium amboinense* from Java along with *A. subpubescens*). The distinctions between *A. subpubescens* and *A. amboinense* were not apparently clear to his co-worker ; the vacillation of his mind in labelling this sheet is the clearest proof thereof. This uncertainty would explain the pasting of a label of *A. subpubescens* to a plant, which in fact was *A. amboinense* in Blume's sense and sending it to Kew, where it has been regarded as a duplicate of the "type specimen" for *A. subpubescens* Blume. The absence of any trustworthy duplicates of the correct "type specimen" at the Kew Herbarium and the British Museum together with the non-availability to most investigators and fern taxonomists of the type specimen due to its presence at Leiden, coupled with the presence of a most misleading specimen with a wrong labelling in the Kew Herbarium, has no wonder, confused many pteridologists of the age, including Ching and added to the nomenclatural confusion of the species complex. It is surprising that this Kew sheet with a specimen of Blume's *A. amboinense* bears Christensen's determination label as *D. subpubescens,* yet, the actual type specimens of *A. subpubescens* Blume (viz. 908337-179) at Leiden have not been determined by Christensen at all, although he has determined a number of other specimens of *A. amboinense* (Blume's sense) as *D. subpubescens* at Leiden. Blume (1828, p. 149) was, however, wise to note that his *Aspidium subpubescens* differs from his *A. amboinense* by its more numerous pinnae, which are more acute and stiffer with deeper teeth.

This should have been enough for Christensen and Ching to differentiate between the two species and to reject the wrongly labelled specimen at Kew as *A. amboinense* instead of accepting it as the type for *A. subpubescens* Blume.

Similarly, another sheet 910327-113 which had been labelled as *Aspidium amboinense* Blume by his co-worker, has been identified as *A. subpubescens* Blume by Blume himself and this sheet has served as the type specimen for *A. subpubescens* Blume at Leiden herbarium (Plate II).

In spite of it, Christensen determines the Kew sheet as *D. subpubescens* (Blume) C. Chr. This was certainly not an oversight with Christensen, for he says in his description of *D. subpubescens* in Gard. Bull. Str. Sett., p. 390, 1929, "The typical form is smaller than *D. parasitica,* the pinnae rarely 10 cm. long, 1.5 cm. broad. Hitherto, this species has been named by most authors as *Nephrodium amboinense* or *N. molle* var. *amboinense,* but it agrees badly with the type specimen of *Aspidium amboinense* Willd. (Bot. Mus. Berlin), which is much smaller and less incised". Christensen should have also realised that it agreed badly with the type

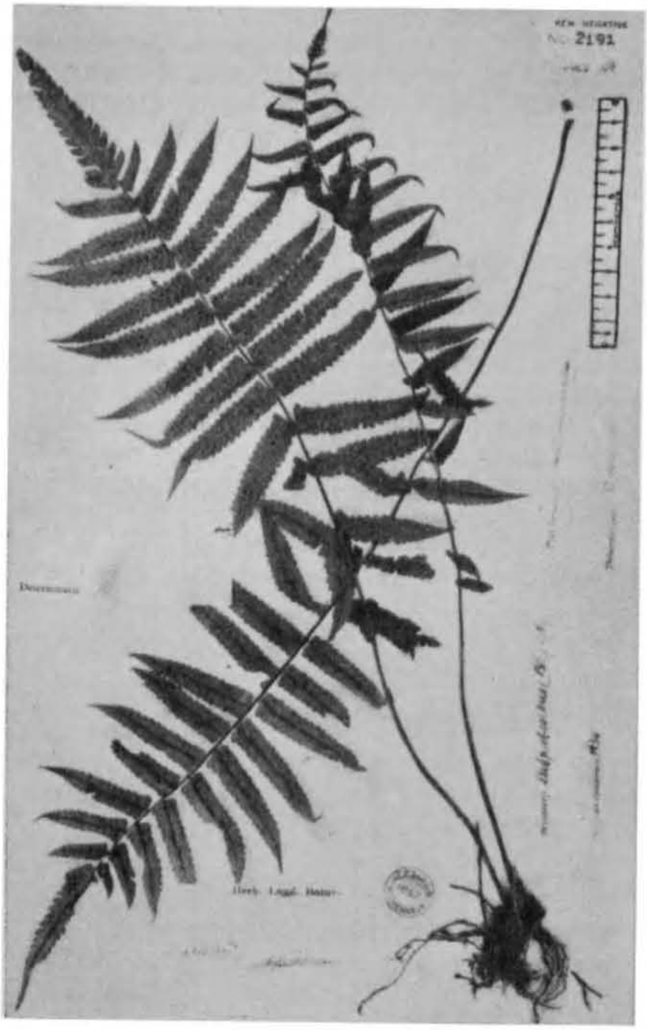

PLATE I. The Kew sheet of *Cyclosorus "subpubescens"* *C. sumatranus* (v.A.v.R.) Ching.

specimen of *A. subpubescens* Blume (Leiden, 908337-113) as well.

Rosenstock, however, saw through this anomaly and described Blume's *A. amboinense* wisely under a new name, *D. pseudoamboinensis* Rosenstock, apparently to illustrate to the posterity that this plant was long confused with *A. amboinense* Willd. Therefore, the specimens in the "type cover" at Kew determined as *D. subpubescens* (Blume) C. Chr. by Christensen, as well as the description of the species given by Ching (1938) under *Cyclosorus subpubescens* (Blume) Ching, in effect, pertain to *Aspidium amboinense* Blume (non *A. amboinense* Willd.) and are *Dryopteris pseudoamboinensis* Rosenstock. This finding, therefore, upholds Holttum's contention of Christensen being wrong and lends support to the view that Holttum's description of this species (cf. Holttum 1954, p. 273-274) should characterise the combination *Cyclosorus subpubescens* (Blume) Ching, based on *Aspidium subpubescens* Blume following the example (f) under Article 55 of the International Rules of Botanical Nomenclature, 1956. Since, however, Ching's combination of *subpubescens* Blume with *Cyclosorus* is followed both by wrong description of the species and by wrong citation of 18 synonyms, which are, therefore, not to be followed subsequently by other taxonomists, it may be permissible to write Ching's combination as *C. subpubescens* (Blume) Ching, non sensu Ching, a suggestion made in agreement with Holttum (personal communication, 1954).

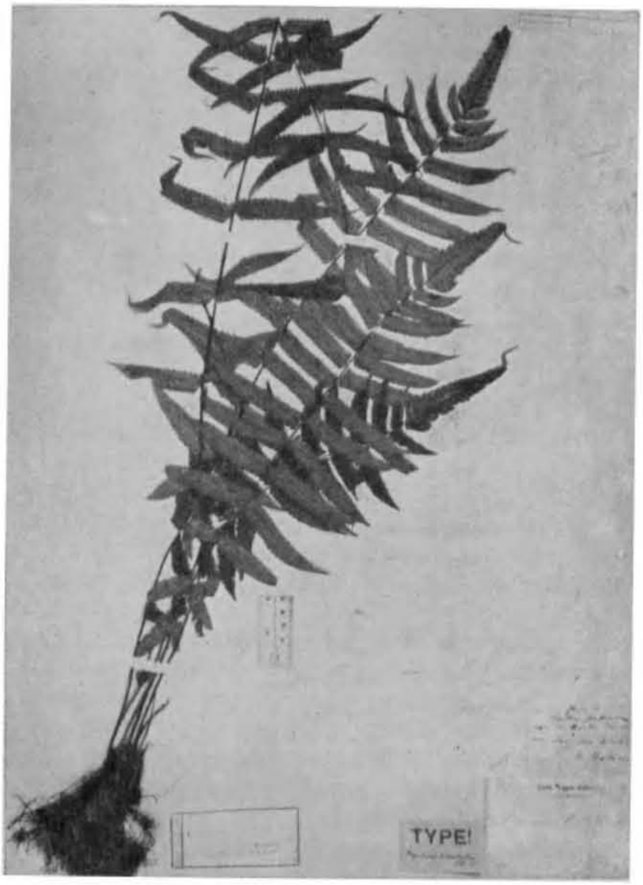

PLATE II. Type of *Cyclosorus subpubescens* (Blume) Ching, non-sensu Ching at Rijksherbarium Leiden.

Although Holttum's description of *Cyclosorus subpubescens* (Blume) Ching is thus confirmed, his interpretation of the scope and limits of this species in including *A. jaculosum* Christ. as synonym to it is not correct. Similarly, Christensen's reference of this Singapore Fern to *Dryopteris subpubescens* var. *major* is also erroneous. The arguments are as follows:

Dryopteris subpubescens var. **major** versus **Cyclosorus subpubescens** (Blume) Ching

D. subpubescens var. *major* C. Chr. is based on *Nephrodium molle* var. *major* Bedd., the following being the citations by Beddome (1892) for the latter:—

(*i*) Plants from Mussorie, collected by Hope with erect caudex.

(*ii*) Plants from Nainital, collected by Dyas with erect caudex.

(*iii*) Plants from Ceylon, collected by G. Wall with creeping rhizome.

(*iv*) A frond from Singapore, collected by Wallich—352/II sheet—Lin. Herb.

(*v*) A frond, "also in Sumatra Herb. Nat. Hist. Mus."

Of these, Hope (1903) accepts (*i*) and (*ii*) as *Nephrodium papilio* and excludes G. Wall's specimens with creeping rhizome from *N. papilio;* although he admits that there is no other difference from his species except for the creeping rhizome. Therefore, the true *Aspidium subpubescens* (Blume) plants with short creeping rhizome and only one pair of anastomosing veins are certainly not ascribable to item (*i*) and (*ii*) of *Nephrodium molle* var. *major* Bedd., which have erect caudex and 2—2½ pairs of anastomosing veins. On the same analogy, *Aspidium subpubescens* (Blume) cannot include in its item (*iii*) *viz.* G. Wall's Ceylon specimens with 2 and 2½ pairs of anastomosing veins, as also wide creeping rhizome. Further, Wallich's 352/II sheet in the Lin. Herb. from Singapore with 25 pairs of pinnae of which 7 pairs of pinnae are gradually reduced, and 12 pairs of pinnae with large deeply lobed auricles with 2—2½ pairs of anastomosing veins compare very badly with *A. subpubescens* Blume with only one pair of anastomosing veins and with pinnae with truncate base without any marked auricles. Regarding the Sumatran specimen in the British Museum (Nat. Hist. Soc.)—less said the better since it is exactly identical with *Dryopteris pseudoamboinensis* Rosenstock, and also with *Cyclosorus sumatranus* sensu Holttum. Holttum (*l.c.*) however, treats the Sumatran specimen as lectotype for *Dryopteris sumatrana* v.A.v.R., which name antidates *D. pseudoamboinensis* Rosenstock and therefore, is now the lectotype of *Cyclosorus sumatranus* (v.A.v.R.) Ching.

Accordingly, it may be concluded that there was no justification whatsoever for Christensen to identify these Singapore specimens to *Dryopteris subpubescens* var. *major*, C. Chr. which in its turn, cannot be cited as a synonym to *Cyclosorus subpubescens* (Blume) Ching non sensu Ching.

Cyclosorus subpubescens (Blume) Ching versus **Aspidium jaculosum** Christ.

Ito (1934) has already made the new combination of *jaculosum* Christ. with *Cyclosorus* which, therefore, is known now as *C. jaculosus* (Christ.) Ito. Reference to Panigrahi and Manton (1958) would show that *C. jaculosus* ($2n = 144$) and *C. subpubescens* ($2n = 144$) are each a tetraploid species and when crossed, produce a sterile tetraploid hybrid with a number of univalents at meiosis. It should be noted that the morphology of the plants of *C. jaculosus* from Ceylon matches exactly with that of the type specimen of *Aspidium jaculosum* Christ. from Formosa although cytology of Formosan plants is not yet known.

Besides, *C. subpubescens* with short creeping rhizome and one pair of anastomosing veins in the pinnae differs markedly in morphological characters from *C. jaculosus* with wide creeping rhizome and 1½ pairs of anastomosing veins (cf. Panigrahi and Manton *l.c.*) Accordingly, both the species are taxonomically distinct and one should not be treated as synonymous to the other.

Therefore, the final nomenclatural position of **Aspidium subpubescens** Blume is as follows:—

Cyclosorus subpubescens (Blume) Ching

Basinym: *Aspidium subpubescens* Blume, Enum. Pl. Jav., 49. 1828.

Synonym: *Dryopteris parasitica* (L.) Kuntze, C. Chr. Ind. Fil. 282. 1905 (pro-parte).

Type specimen at Rijksherbarium, Leiden 910327-113.

Type duplicate at Rijksherbarium, Leiden—908337-179.

Other specimens identified as *Cyclosorus subpubescens* (Blume) Ching are:—

RIJKSHERBARIUM, LEIDEN:

923362-532 E. D. Merril, Borneo; 94312-351-Java; 942335-359-Java; 938187-169-Batavia; 947332-155; 936258-172; 910336-415; 908335-1113 Borneo (in part); 908353-69-Rosenstock; Butenzorg, 908337-203-Mexico; -210 Brazil; -208, Brazil-207; -206, -167, Wright, Cuba; 908335-1117 Canada, -1008 Mrs. W. Roy, Canada; -939; -927-930 Tropical Africa, 908191-744 Colombia.

KEW HERBARIUM, LONDON:

W. Hancock 26, Hainan; Erylsmith 229, Siam; Aitcheson 17, Punjab; J. F. Duthie 23245, W. Himalayas; G. Watt 9177 Pareshnath; Griffith 2239/2 Monghyr; W. Gamble 5572A Darjeeling 6000′; W. Gamble 5573A Darjeeling; H. F. Blanford—Simla (Second waterfall Sunal Valley—5000′); C. W. Hope —Mussorie 3000′; J. S. Gamble 9017—Chotanagpur, 2500′; T. F. C. Tuly 772 Auckland, N. Zealand; C. C. Hosseus 888 Siam; Login—Valley of Nepal; Wight 177a Peninsula; H. N. Ridley—Selangor; -237 Ceylon; —Mahabaleshwar; J. J-Wood 177 Chota Nagpur.

It appears, therefore, that *Cyclosorus subpubescens* which is an amphidiploid, to which *C. repandulus* (v.A.v.R.) Ching or a form with similar homology of chromosomes is ancestral (Panigrahi and Manton, 1958), has a very wide geographical distribution and is found not only in the tropical and subtropical Asia, but also extends upto Canada in the north and Brazil and New Zealand in the south.

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